

**NATIONAL PARK SERVICE
SOUTHERN COLORADO PLATEAU NETWORK
TASK AGREEMENT
For
USDI, U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
To
INTERAGENCY AGREEMENT # IA238099002**

TASK AGREEMENT NUMBER: 03-50

PARK: Southern Colorado Plateau Network

PROJECT DESCRIPTION: The NPS Southern Colorado Plateau Network (SCPN) and the USDI U.S. Geological Survey Water Resources Division (USGS-WRD) will cooperate in the acquisition, management and synthesis of existing water-quality data associated with waters of SCPN Parks. The USGS-WRD has considerable experience in the collection, management, and interpretation of water quality data for the Colorado Plateau region.

The attached Scope of Work outlines work needed to complete Phase I and II of the monitoring planning process, specifically the water resources and water-quality portion of the plan. The attached scope of work identifies tasks needed to complete the entire project. Under this task agreement (03-50), funding is being allocated for tasks 1-16 (Part A). Based on the availability of NPS/WRD funding to the SCPN, funding for completion of tasks 17-26 (Part B) will be provided through another task agreement in FY04.

The following work will be completed as part of this task agreement:

1. Compile and review Horizon reports and other published literature for each park unit to identify available data;
2. Negotiate and coordinate USGS participation, as needed, from personnel stationed in USGS offices in Utah, Arizona, and New Mexico;
3. Acquire and compile water-quality data for SCPN Parks from STORET Legacy, STORET X, NPS, USGS NWIS databases, State Agencies, and other electronically available data sets that may be identified;
4. Inventory, acquire, and compile pertinent, electronically available GIS data;
5. Develop and deliver relational MS Access database with water-quality data, database documentation and data dictionary, and documented protocols for periodic database updates, and a companion ESRI ArcGIS map project with associated GIS data sets;
6. Prepare data summaries for and participate in meetings concerning water-quality measures most appropriate for inclusion in park vital signs monitoring.
7. Summarize existing water-quality data in relation to regulatory standards and Park management issues;
8. Identify data gaps in relation to existing water-quality sampling and Park management issues;
9. Provide published report of results regarding water-quality conditions (spatial distribution, trends, comparison to standards, suitability of existing data to characterize conditions).

DELIVERABLES: All deliverables as specified in the attached scope of work need to be provided to SCPN in MS Office software formats.

PROJECT SCHEDULE AND PAYMENTS: Project Initiation – July 1, 2003

- Identification of water resource issues and initiation of data compilation by September 30, 2003 (deliverables 1-2)—invoice payable up to 25%.
- Meeting participation and delivery of relational database by February 1, 2004 (deliverables 3-5)—invoice payable up to 80%
- Final database, database documentation, and data summary document by June 1, 2004 (deliverables 6-10)—invoice payable up to 100%

NOTE: INVOICES WILL BE SUBMITTED BY USGS TO THE NPS WASHINGTON OFFICE. THE NPS AGREEMENTS SPECIALIST WILL THEN CONTACT THE NPS TECHNICAL REPRESENTATIVE (SCPN I&M Program Manager) TO OBTAIN APPROVAL FOR PAYMENT PROCESSING. PAYMENTS WILL BE APPROVED BY THE NPS TECHNICAL REPRESENTATIVE IF WORK IS PROCEEDING AS PLANNED AND WHEN PRODUCTS HAVE BEEN APPROVED.

COST: Not to exceed \$126,300 for non-interpretive components during FY 2003-04 (Current task agreement 03-50 as described in Part A of attached Scope of Work)
Not to exceed \$ 65,000 for interpretive components during FY2004-05 (Future task agreement as described in Part B of attached Scope of Work).

FUND SOURCE: NPS, Natural Resource Challenge Funding, Acct # 2121-0301-NWZ and Acct # 2121-2002-NII

PROJECT SCHEDULE: July 1, 2003 through December 31, 2004 for this task order; June 1, 2004 through September 30 2005 for Part B of attached Scope of Work.

PRINCIPAL CONTACTS:

National Park Service		
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PROJECT APPROVAL**USDI, National Park Service****USDI, USGS-WRD**_____
Shirley Norton, Contracting Officer_____
William F. Horak

Date: _____

Date: _____

SOUTHERN COLORADO PLATEAU NETWORK VITAL SIGNS WATER QUALITY DATABASE DESIGN AND DATA SYNTHESIS PROJECT

SCOPE OF WORK

OVERALL PROJECT DESCRIPTION: The Southern Colorado Plateau Network (SCPN) parks are tasked with developing a monitoring program to assess park natural resources. The SCPN is one of 32 vital signs monitoring networks nationwide in the National Park Service (NPS). The network is comprised of the following 19 NPS administered units in the states of Colorado, Utah, Arizona and New Mexico: Aztec Ruins NM, Bandelier NM, Canyon de Chelly NM, Chaco Culture NHP, El Malpais NM, El Morro NM, Glen Canyon NRA, Grand Canyon NP, Hubbell Trading Post NHS, Mesa Verde NP, Navajo NM, Petrified Forest NP, Petroglyph NM, Rainbow Bridge NM, Salinas Pueblo Missions NM, Sunset Crater Volcano NM, Walnut Canyon NM, Wupatki NM, Yucca House NM.

A document entitled the National Park Service's Vision and Implementation Strategy for Park Vital Signs Monitoring (NPS, October 2000) describes the monitoring planning and design efforts. A water-quality component of this program has been specified. The development of network monitoring programs is a complex process that requires a front-end investment in planning and design to ensure that monitoring will meet the most critical information needs of each park and produce scientifically credible data. The Washington Office of NPS has identified three phases of monitoring planning and plan development for vital signs monitoring networks and has provided a detailed outline of plan content. Phase I is concerned with synthesizing existing information on monitoring in the parks and partners, identifying key management issues and developing conceptual models to support planning efforts. Phase II focuses on steps involved in selecting vital signs indicators and documenting the rationale and process.

This scope of work outlines work needed to complete Phase I and II of the monitoring planning process, specifically the water resources and water-quality portion of the plan. Phase III deals with monitoring plan design and is not part of this task agreement. The FY03 task agreement will address Part A of the attached scope of work, and is concerned primarily with identifying water resource issues, compiling water resources data and related spatial data into an Access database, providing data summaries for SCPN scoping meetings, and developing tools to enhance database utility. Part B of the attached scope of work addresses data analysis and interpretation to identify trends and patterns in water quality and water quantity conditions, compare water quality conditions to selected standards, and assess the adequacy of existing data to meet monitoring objectives. Based on the availability of NPS/WRD funding to the SCPN, a second task agreement would fund Part B of the attached Scope of Work in FY2004.

PART A:

Identify Water Resource Issues

1. Compile and review published reports (including Horizon reports) related to water quality in and around SCPN units. As part of this task, coordinate with SCPN to identify key data and bibliographic sources. Review narratives prepared by SCPN that describe past and current water-quality monitoring in and around SCPN units.

2. Contact USGS personnel in Colorado, Utah, Arizona, and New Mexico regarding past and present activities, data, and reports relevant to the SCPN Vital Signs process. Coordinate USGS participation from outlying offices, as needed.

Compile Water Resources Data

3. Retrieve/acquire relevant digital GIS data layers for use in data retrieval and analysis activities. Metadata accompanying compiled GIS layers (shapefiles, coverages or images) will be maintained and provided with GIS files. This task does not involve the creation of new data layers except where applicable queries (e.g., selections, buffering) are applied to existing data sets. Develop a companion ESRI ArcGIS map project with associated GIS data sets that will be linked to the relational MS Access database.
4. Retrieve raw water-quality (surface and ground-water) data from STORET Legacy, STORET X, and USGS NWIS databases based on criteria established in consultation with SCPN Data Manager and cooperators. Obtain available digital data sets from NPS and State Agencies. Retrievals will include the most recent data available from the USGS NWIS, STORET X, and other electronically available data sets. Acquisition will include all significant data presumed to be of good quality from within SCPN units, as well as relevant data upstream and downstream data that bracket SCPN units and historical, relevant NPS sampling sites. Compilation of data from Grand Canyon Monitoring and Research Center is not within the project scope.
5. Work with SCPN Data Manager and other cooperators to identify additional available data and to develop quality and format criteria for compilation of these data sets (i.e., data sets not in databases listed under Task 5) that could be acquired from Parks and/or other outside agencies. Inclusion of these data in the database and data synthesis requires that they are readily available in electronic format.
6. Contact organizations and/or agencies to ascertain availability of additional data sets (identified under Task 6) pertaining to waters of SCPN parks (e.g., aquatic macroinvertebrate data sets). Acquire pertinent available data following criteria developed under Task 6. Work with SCPN Data Manager to ensure that acquired data are incorporated in SCPN Dataset Catalogue database. If pertinent good-quality data sets are identified but not acquired, notify SCPN Data Manager so that these data sets also can be incorporated in the SCPN Dataset Catalogue database.
7. Prior to loading into a relational MS Access database, clean and filter out data compiled during the retrieval process that are not pertinent to SCPN issues and format, as needed, data for loading into MS Access. For example, data unrelated based on location or an inaccurate sampling location or other known data quality problems. Filtering and cleaning processes will be documented within database documentation (see Tasks 13 and 16).
8. Load data, acquired under Tasks 5 and 7 above, into a relational MS Access database with structural design elements that prevent duplication of data or import of data that fail certain quality tests such as invalid values or invalid data types. Inherent to this new database will be a simple structure that facilitates data management and data retrieval. Database design structure will include unique ID numbers that allow linking of database records with associated geospatial features (sample locations) in GIS and features that ensure data protection during updates. Consult and coordinate with SCPN Data Manager during database development.
9. Prepare standard queries and data summary tools for answering common water-quality questions (e.g., exceedances, data gaps). Consult and coordinate with SCPN Data Manager during development of this task.

10. Work with SCPN Data Manager and other cooperators to develop prioritizations and criteria for data post-processing activities including: reviewing site locations to remove invalid sites and to merge sites representing equivalent geographic locations; tagging sites with degradation or protection status (e.g., 303d listing, Outstanding National Resource Waters) and NHD Reach Code; identifying rare data; and data-quality assessment.
11. Create GIS layer of water quality and quantity (gaging stations) sampling locations with unique location IDs that allow linking of geospatial features with associated database records in MS Access (Task 9).
12. Prepare relational MS Access database documentation, including explanation of the data-compilation process, database design, data post-processing, database utility, database update procedures, data dictionary (explanation of database fields), and a basic user guide.

Database Utility and Management

13. Develop tools to enhance database utility for individual park scientists and network managers (such as a GIS interface for data visualization, packaged queries, and a user interface to automate the development of queries).
14. Update database documentation as needed to incorporate changes in database fields, operating procedures, utilities and metadata.
15. Merge sample locations with common geographic locations into single sample-site identifiers to facilitate analyses as single sites. Complete data post processing as prioritized in task 11.

Summarize Data for Use in Phase II

16. Provide data summaries (tables, graphs, and maps) for SCPN Phase II scoping meetings tentatively planned for February and June 2004. Participate and provide technical input during scoping meetings, including making water-quality database available for interactive usage by the group during the meetings.

PART B:

Data Analysis and Interpretation (Components of Part A and Part B Task Orders)

17. Conduct data analysis and interpretation to identify trends and patterns in water-quality and water quantity conditions that will influence the network monitoring design.
18. Examine the frequency of data censoring as an indicator of utility of data to describe water-quality conditions and trends.
19. Explore temporal (between-year, seasonal, diurnal) and spatial variability in the water-quality data and the relationship between variability and potential contributing factors (e.g. discharge, climate, land use).
20. Compare water quality data with state standards and prepare summary tables, figures, and maps describing water-quality conditions of waters within and passing through NPS boundaries. Depending on availability of adequate data, assess temporal trends and spatial patterns in selected water quality parameters to facilitate interpretation of data in relation to land-use factors and 'background' conditions that may inform the design of the network water-quality monitoring plan.
21. Provide summaries of available data, including suitability of data for certain analytical methods, and work with park and network NPS staff to develop a prioritized listing of constituents and data analysis methods for purposes of characterizing water-quality conditions in each NPS unit.
22. Provide an assessment of the adequacy of existing water-quality monitoring in and adjacent to parks based on available data, statistical considerations, Park water-quality issues, and on knowledge of the Park setting.

Technical Support to Parks (Component of Part A and Part B Task Orders)

23. Provide review comments on draft NPS documents pertaining to the development of the SCPN Vital Signs monitoring program, as requested.

Final Report and Other Tasks (Component of Part A and Part B Task Orders)

24. In cooperation with SCPN staff and to the degree possible, coordinate this project with the NPS Northern Colorado Plateau Network to minimize duplication of effort in planning and development of a water-quality monitoring plan and contribute to a coordinated effort.
25. Maintain frequent interaction with SCPN staff and members of the SCPN water-quality subcommittee, including participation in conference calls and in-person meetings as required.
26. Work with SCPN staff to prepare a USGS-approved and published technical report of results. This report will summarize USGS efforts for SCPN including database design and data acquisition, data analyses and synthesis. This manuscript will be co-authored by selected SCPN personnel.

DELIVERABLES:

This section describes required deliverable products associated with this project. Review and final drafts of reports and database documentation will be submitted in printed (duplicate) and electronic forms in MS-Office 2000 compatible formats.

Part A Deliverables:

Deliverable product:	Due Date:
1. Written review comments on water resource sections of Phase I draft report, as described in Task 2.	08/25/03
2. Relational MS Access water-quality database, as described in Tasks 8 through 11 above. Database will be used during February workshop.	02/01/04
3. GIS layer of water quality and quantity sampling station locations identified, capable of being linked with associated records in the relational MS Access database, as described in Task 12 above.	02/01/04
4. Associated GIS layers, associated metadata and ArcGIS map project file used for SCPN project, as described in Task 4.	02/01/04
5. Written database documentation, including data compilation, database design, data dictionary, user guide, data-update protocols, as described in Task 13 above. Documentation will include explanation of included queries and data summary tools. Written protocols will describe recommended methods for periodic database updates (including a tracking process for keeping up with continuing data streams).	06/01/04
6. Progress reports including update on results of data analyses and interpretations, site visits and other park technical support, and status of deliverables. Materials will be used in Vital Signs workshop.	Periodically, as needed
7. Data summary document.	6/01/04
8. Final MS Access database and associated documentation: data dictionary, user guide, standard queries for answering common water-quality questions, and written protocols describing recommended methods for periodic database updates (including a tracking process for keeping up with continuing data streams). ArcGIS database and associated documentation, with locations of past water quality and quantity sampling stations differentiated and capable of linking with associated records in the MS Access database.	06/01/04

Part B Deliverables:

Deliverable product:	Target Date:
9. Written review comments on water resource sections of Phase II draft report.	08/20/04
10. First draft of USGS-NPS jointly authored technical manuscript on database development, data acquisition, data analyses and synthesis (including a discussion of implications for park resources).	02/01/05
11. Final, published, USGS-NPS jointly authored technical manuscript on database development, data acquisition, data analyses and synthesis.	09/30/2005

NPS ROLE AND RESPONSIBILITY: SCPN staff will work with USGS throughout the project on refining and accomplishing the stated tasks, providing direction, access to files and other information. NPS agrees to:

- ◆ Provide orientation to project objectives and integrating the requirements of this cooperator with other cooperators.
- ◆ Providing general guidance as needed.
- ◆ Assist with the development of data compilation and data post-processing prioritization and criteria necessary to meet the terms of this task agreement.
- ◆ Participate in meetings, conference calls, briefings, and reviews needed to meet the terms of this task agreement. Establishing minimum frequency and regular schedule for conference calls and/or meetings is suggested.
- ◆ Assist in the acquisition of additional water-quality data sets (e.g., aquatic macroinvertebrate data) acquired from SCPN Parks, State Agencies, or other agencies following criteria developed under USGS Task 6, above.
- ◆ Provide for USGS review of narrative summaries describing past, present, and future concerns regarding water-quality issues.
- ◆ Provide for USGS review of narrative descriptions of past and current water-quality monitoring in and around SCPN units.

Work Plan by Task	Federal Fiscal Year Quarter									
	FY03		FY04				FY05			
	3	4	1	2	3	4	1	2	3	4
SCPN WORK PLAN										
Part A: Identify Water Resource Issues (Tasks 1-2)										
Compile historical reports.		X	X							
Coordinate USGS participation as needed.		X	X			X				
Part A: Compile Water Resources Data (tasks 3-12)										
Acquire GIS data layers.		X	X							
Retrieve water-quality data.		X	X							
Catalog pertinent but unavailable data.					X					
Clean and filter raw data sets.			X	X						
Load Microsoft Access relational database.			X	X						
Prepare standard queries for data summary/retrieval.			X		X					
Develop post-processing plans.			X							
Prepare database documentation.				X						
Part A: Database Utility and Management (tasks 13-15)										
Develop tools to enhance database utility.		X	X							
Update database documentation as needed.										
Conduct post-processing of data.				X						
Part A: Data Summary for Use in Phase II (task 16)										
Provide data summaries for Phase II scoping meetings.				X	X					
Participate in phase II meetings to assist with prioritization of constituents.				X	X					
Part A and B: Data Analysis and Interpretation (tasks 17-22)										
Conduct data analysis and interpretation to identify trends and patterns in water-quality conditions.					X	X	X			
Conduct exploratory analysis to examine issues relating to data variability and the power to detect trends. This will include exploring temporal and spatial data variability.					X	X	X	X		
Compare water-quality conditions to selected water-quality standards.					X	X	X			
Parts A and B: Technical Support to Parks (task 23)										
Provide review comments for draft SCPN Vital Signs documents.		X				X				
Parts A and B: Final Report and Other Tasks (tasks 24-26)										
Coordinate project with NCPN Vital Signs process.		X	X	X	X	X	X	X	X	X
Maintain frequent communication with SCPN staff and their contractors.		X	X	X	X	X	X	X	X	X
Prepare USGS-approved technical report of results.						X	X	X	X	X

FY03 - BUDGET FOR SCPN Database Design and Data Analysis (Task Agreement 03-50)			
Work Plan Item	Cost	Subtotals	Totals
Identify Water Resource Issues			
Salary and Benefits	7,557	7,557	
GS-12 Hydrologist 100 hours			
GS-9 Hydrologist 80 hours			
Direct Costs			
Travel			
Other	575	575	
Indirect Costs: 83% of NET	6,762	6,762	
Task Total			\$14,894
Compile Water Resources Data			
Salary and Benefits	24467	24467	
GS-12 Hydrologist 95 hours			
GS-12 Hydrologist 60 hours			
GS-9 Hydrologist 525 hours			
Direct Costs			
Travel	500	3,629	
Other	3,129		
Indirect Costs: 83% of NET	23,363	23,363	
Task Total			\$51,459
Database Utility and Management			
Salary and Benefits	15575	15575	
GS-12 Hydrologist 120 hours			
GS-12 Hydrologist 50 hours			
GS-9 Hydrologist 200 hours			
Direct Costs			
Travel			
Other	1,646	1,646	
Indirect Costs: 83% of NET	14,321	14,321	
Task Total			\$31,542
Initial Data Analysis and Interpretation			
Salary and Benefits	13,454	13,454	
GS-12 Hydrologist 83 hours			
GS-11 Hydrologist 72 hours			
GS-9 Hydrologist 205 hours			
Direct Costs			
Travel	500	2,055	
Other	1,555		
Indirect Costs: 83% of NET	12,896	12,896	
Task Total			\$28,405
GRAND TOTAL			\$126,300

The following items for data analysis and manuscript publication are not funded as part of the current task agreement. It is anticipated that FY04 funding will be used to complete this part of the project.

Work Plan Item	Cost	Subtotals	Totals
Completion of Data Analysis and Interpretation			
Salary and Benefits	10,920	10,920	
GS-12 Hydrologist 67 hours			
GS-11 Hydrologist 58 hours			
GS-9 Hydrologist 165 hours			
Direct Costs			
Travel			
Other			
Indirect Costs: 83% of NET	9,080	9,080	
Total			\$20,000
Technical Support			
Salary and Benefits	2,252	2,252	
GS-12 Hydrologist 23 hours			
Direct Costs			
Travel			
Other			
Indirect Costs: 83% of NET	1,873	1,873	
Task Total			\$4,125
Final Report and Other Tasks			
Salary and Benefits	22,024	22,024	
GS-12 Hydrologist 58 hours			
GS-11 Hydrologist 144 hours			
GS-9 Hydrologist 88 hours			
Direct Costs			
Travel			
Other	293	293	
Indirect Costs: 83% of NET	18,558	18,558	
Task Total			
			\$40,875
Grand Total			\$65,000